

has to do it to save its own revenue, but it does it so that Holtwood [11117] can perform.

[11144] Q. Now, at line 25 you allocated all of the general plant to pool, did you not? A. That is right.

Q. And that again is on the assumption that all of that plant is used by all customers jointly. Is that right? A. That is right.

Q. Did you examine the character of the items included in that figure of \$779,707 at line 25 to determine whether or not there were any of those items which were used exclusively for one or more customers? A. No, there was no detailed examination of that, just general plant that couldn't be assigned, so far as I was able to discover, to any particular customer.

Q. Well, would it surprise you very much to find that there are items of cost included in that figure relating to equipment used entirely in connection with the Highlandtown line which you have allocated 100 per cent to Baltimore? A. Well, that would be news to me.

Q. If that is the fact, wouldn't that mean that some of those items in the general plant, line 25, column 6, should be allocated to Baltimore? [11145] A. Well, I would have to know the nature of the items. Of course some of this is allocated to Baltimore. It is simply put in the pool to be allocated on a different basis than directly a hundred per cent.

Q. I understand that, Mr. Davis, but if any item in there were used 100 per cent for Baltimore, it should be allocated directly to Baltimore in column 5 in your view. Isn't that right? A. That would be the natural way to do it if that could be identified.

Q. Now, likewise, if there are any items in that figure at line 25, column 6 which are used exclusively in connection with transmission facilities, it should be allocated in proportion to the manner that you allocated transmission facilities. Isn't that right? A. Well, a portion of

this item is allocated to transmission. That is, all of the pool is segregated between production and transmission and then these general items are spread to the different classes on the ratio of the direct investment, so a part of it gets there in any case.

Q. But it doesn't get there in any case, as you put it, in the manner and under the theory that you have used in making up Table I of Exhibit 64, does it? A. No, it gets there through a general allocation [11146] from the pool.

Q. And that allocation to the various customers may not be in the same proportion as it would be if you had allocated directly in cases where they are used exclusively for a customer? A. That is possible.

Q. Did you examine the character of the items included in that total of 779,707, line 25, column 6, Table I of Exhibit 64? A. I don't recall that I did.

Q. Did you examine any of the items appearing in line 24, column 6 of Table I of Exhibit 64? A. No, I treated intangible and general plant as general items and allocated them on a general basis.

Q. And what that means, does it not, is that all general and intangible plant is assumed to be used in connection with the items allocated to pool? A. And it is allocated to all the customers on the basis of use.

Q. And it means, does it not—well, was your answer "yes" to that last question? A. It is in the pool, yes.

Q. And that answer means, does it not, that none of the intangible or general plant is assignable to items like Violet Hill Switching Station, or Holtwood-Lancaster [11147] line, or the Engleside Switching Station, the Donegal and Donegal Tap Switching Stations, or any of the other items for which there were no amounts allocated to the pool? Isn't that right? A. It is not allocated to those items of property. It is allocated to those companies.

Q. Well, are you saying that there is no intangible or general plant assignable to Baltimore, or any of the other

companies specified in Table I by reason of the fact that there are the various facilities that you show in columns 1, 2, 3, 4 and 5 allocated to those companies? A. I had no segregated items of general or intangible plant, and I allocated nothing directly to an individual customer on the basis of the individual items.

Q. Now, since you say you did allocate the items appearing in line 24 and 25 to the various customers in accordance with their use of capacity and energy, that means, does it not, that you are not allocating those costs to the various customers in proportion to their direct use of certain facilities? Isn't that right? A. I had no segregation of individual items. The allocation was made entirely on the total on the basis of use.

Q. Well, how did you know that the various customers used that intangible and general plant in proportion—that [11148] is, directly in proportion to the basis that you split up the pool costs? Did you make any investigation to determine whether that is the fact or not? A. I never had any breakdown of those items that I used. I used them only in total.

Q. Well, I don't think you have answered my question, Mr. Davis. Did you make any investigation to determine whether or not the general and intangible plant was in fact used by the various customers in the same proportion as you split up the pool costs? A. I have no recollection of having any information that there were directly allocable items contained in those two accounts.

Q. I didn't ask you that, Mr. Davis.

THE WITNESS: I made no investigation to determine any direct items that belonged specifically to an individual customer.

MR. MYSE: Mr. Examiner, I haven't asked him that.

TRIAL EXAMINER: That doesn't answer the question, Mr. Witness. Take the question again.

(Question read again.)

THE WITNESS: What I intended to say was that I didn't.

[11149] By MR. MYSE:

Q. Now, it is a fact, is it not, that none of the amounts shown in line 26 as total plant in service includes any amounts which were associated with construction work in progress in the year 1944? Isn't that right? A. That is true.

Q. Nor do those amounts at line 26 include any amounts associated with plant held for future use by the company in 1944. Isn't that right? A. They do not.

Q. Isn't it a fact that in line 22 which you label, "Transmission" in the amount of \$1,560,090 in column 6, Table I of Exhibit 64 is included the amount of investment relating to the Manor Substation? Isn't that right? A. I think so.

Q. Well, can you check it for me and determine that? A. All right.

It would include that. It includes everything that is not specifically allocated in the items above.

Q. Well, Manor Substation is the switching point near Safe Harbor plant where the connection is made between the lines to Safe Harbor plant to the circuit to Westport and to Riverside. Isn't that right? A. Yes.

Q. So that in reality it is a terminal switching [11150] station for the 220 kv lines. Isn't that true? A. That is right.

Q. So that if it is to be allocated at all, it should be allocated in the same manner as the Westport and Riverside lines. Isn't that right? A. That might be an acceptable way to do it.

Q. Isn't it right, if you are right on your allocation of the Westport and Riverside lines? A. That is probably true.

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[11151] Q. As I understand your testimony at page 1179 with respect to line 2 of Table II, you also obtained all those figures from the Commission accountants. Is that right?

A. That is right.

Q. So you take no responsibility for the accuracies of any of those figures on that line? A. No.

Q. Where did you get the figures for working capital appearing on line 6 of Table II of Exhibit 64? A. The cash working capital is twelve-and-a-half per cent of the operating expenses. Materials and supplies are reported by the company in the Form 1 report.

Q. Well, are you saying—I think it is correct and you can correct me if I am wrong—that the total working capital appearing in line 6, \$590,000, you obtained from another Commission Exhibit? Isn't that right? A. Yes, that checks with the figure that was presented in another exhibit.

Q. Well, you say it checks with it. Are you saying that you made an independent determination of the amount in [11152] column 7? A. No, I made no independent determination. I simply spread the two items of cash working capital and materials and supplies on a ratio of operating expenses and of investment to the various customers and the pool.

Q. Then, as I understand it, you take no responsibility for the accuracies— A. For the total amount, no.

Q. Nor do you take any responsibility for accuracies of either of the amounts in columns 1 through 6. Isn't that right? A. No, I do not.

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[11162] Q. Now, what is this adjustment credit to administrative and general expenses which you deducted in arriving at \$1,789,874 balance of operating expenses, as you call it, for the year 1944? A. That is the item that was shown on the Holtwood bill to Baltimore.

Q. Shown how? A. Shown as a credit.

Q. Well, are you saying that Holtwood doesn't incur that expense of \$9,703? A. That is an adjustment that was made on the Holtwood bill in connection with general expense which I accepted as a credit here on the advice of the accountants.

Q. Well, did you make any investigation to determine the character of the item and the purpose for which it was credited on the bill? A. No.

Q. Would you be surprised to learn that the entire amount of \$9,703 was actually incurred as operating expense in 1944 by Holtwood? A. The only thing that I knew about it was that it was credited on the bill as a deduction.

Q. Would you be surprised to learn that it was an operating expense? A. I couldn't check that because I didn't know what it [11163] was.

Q. Well, if part of that amount had been incurred in paying a salary of one of the employees of Holtwood Company, would you consider it an operating expense? A. Surely.

Q. If part of that amount had been incurred in paying insurance obtained by Holtwood Company, would you consider it as an expense, an operating expense? A. Surely.

Q. If part of that amount had been incurred by Holtwood in paying fees to directors, would you also consider that an operating expense? A. Surely.

Q. So if those three items that I just mentioned are included in the figure of \$9,703, and since you have deducted that in arriving at operating expenses, you have not allocated all operating expenses of Holtwood Company to that extent, have you? A. If those are operating expenses, I have taken them out.

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[11164] Q. Now, at line 2 you show an item of \$992,535 which you label as the bill for Safe Harbor power. Is that right? A. Yes.

Q. And that bill, I believe you agreed at one time, was not the actual bill in 1944. Isn't that right? A. No, that is the cost of Safe Harbor power as developed in Exhibit 60.

Q. Well, you don't take any responsibility for Exhibit 60, do you? A. No, I just took the figure out of Exhibit 60.

Q. So you take no responsibility for the accuracy of this figure in line 2. Isn't that right? A. That is correct.

Q. Now, you know, however, that the amount actually paid to Safe Harbor was \$1,214,533 in 1944, do you not? A. That is right.

Q. And that payment was required under the terms of E, [11165] F, and G in 1944, wasn't it? A. That is right.

Q. Well, now, in the year 1944, whatever was paid by Penn Water to Safe Harbor includes compensation to Safe Harbor, does it not, for special facilities used for service to the railroad. Isn't that right? [11166] A. Compensation paid to Safe Harbor by Holtwood includes one-third of all of its costs, special facilities and other costs.

Q. Well, to the extent that it does cover one-third of Safe Harbor's costs, it covers a portion at least of the costs incurred by Safe Harbor in providing special facilities for railroad use, and I am referring to the 25-cycle single-phase facilities. Isn't that right? A. That is correct.

Q. And to the extent that the payment by Penn Water to Safe Harbor includes or covers one-third of Safe Harbor's costs, it includes compensation to Safe Harbor for Safe Harbor's facilities used for railroad purposes in Maryland as well as in Pennsylvania. Isn't that right? A. It includes one-third of all of them.

Q. Isn't my statement correct? A. I think that is true, yes.

Q. So that the payment from Penn Water to Safe Harbor includes some compensation, undefined, of course, for services rendered to the railroad in Maryland which you say was for the account of Baltimore. Isn't that right?  
A. That is right.

Q. Do you know approximately what percentage of the facilities owned by Safe Harbor are used for service to the railroad in terms of dollars? [11167] A. No, I don't know the percentage.

Q. I take it, then, you wouldn't be able to give me the figure as to the approximate percentage of Safe Harbor facilities used for the railroad in Maryland in terms of dollars. Is that right? A. The investment in facilities for the railroad was given to me as \$1,934,300.

Q. That is total investment for railroad facilities, you say, at Safe Harbor? A. Yes.

Q. What percentage is that of the total investment at Safe Harbor? A. I don't happen to have that total figure before me.

Q. Well, that million-some-odd dollars, however, is just the investment in special facilities. Isn't that right? It does not include whatever investment may be made at Safe Harbor in order to make the service to the railroad effective, and I have reference to the substructure under the 25-cycle generator units, for example. A. I think it includes all of the excess costs over what would have been the cost of a 60-cycle machine. That is what I was informed.

Q. So that it does not include all of the costs or [11168] investment of Safe Harbor in facilities now used for service to the railroad? A. No, it doesn't include all the cost of the generators, only the excess, as I understand it.

Q. So as I understand it, you would be unable to tell me without further investigation what percentage of the investment or costs in the form of operating expenses incurred by Safe Harbor in connection with facilities used

for the railroad are to the total costs incurred by Safe Harbor? A. No, I wouldn't be able to do that.

Q. Do you know roughly or approximately what percentage of the Safe Harbor facilities that are used in terms of dollars for service to the railroad are used for service to the railroad in Maryland? A. Well, my allocation of that would be 39 per cent.

Q. Well, are you saying that 39 per cent, then, represents the percentage which you would apply in allocating the dollars of investment, or operating expenses incurred by Safe Harbor for purposes of railroad service to the service to the railroad in Maryland? A. Yes, that is the ratio of the total output of the 25-cycle end of Safe Harbor plant to the energy going through for Maryland service over the Perryville line.

Q. And that allocation, then, would it not be on the [11169] basis of use of energy only? A. That is right.

Q. It would have no elements in it relating to the use of capacity, would it? A. Well, that would allocate the capacity cost on the basis of energy only, that is true.

Q. Now, as I understand your testimony, the figures on line 4 again you obtained from the Commission Accountants and you take no responsibility for them. Is that right? That is line 4, Table IV. A. That is right.

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[11176] Q. Now, if Baltimore had billed Penn Water for the backfeed it actually received in 1944, there would have been a bill for backfeed purchased, would there not? A. You mean if they had rendered a bill there would have been a bill?

Q. Yes. A. Yes.

Q. And there would have been a corresponding expense by the amount of that bill. Isn't that correct? A. That is true.

Q. And as I understand it, that bill, if it had been rendered in 1944, would have been upon the basis specified

in Article 6 of Exhibit Item "H". Isn't that right? A.  
If there had been a bill for backfeed—

[11177] Q. In 1944. A. —from Baltimore to Holtwood?

Q. That is right. A. There would have been in accordance—well, I believe that is the only basis in the contract that shows a specific method of billing; in 1944 they did not use that method.

Q. But if they had, that would be the basis that they would have used. Isn't that correct? A. That is the only thing in the contract that I know of that would have given them a basis to render a bill.

Q. Now, to the extent you have not included the dollars actually paid out by Holtwood to various Pennsylvania customers for interchange purchases, you have not included all of the costs incurred by Holtwood in line 6 of Table IV, Exhibit 64, for the year 1944. Have you? A. No, I have treated that on a net basis as a revenue.

Q. I didn't ask you how you treated it. The fact is you haven't included all the expenses of Holtwood in Table IV. Isn't that right? A. That is true.

Q. So that Table IV does not reflect all the actual costs of Holtwood. Isn't that right? A. It reflects all those that were not paid for by [11178] Pennsylvania customers.

Q. Well, will you tell me whether my statement is right or not? A. You are right as far as you go.

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Q. Now, here again as I understand it, you are not [11179] responsible for any of the figures nor do you testify as to the accuracies of any of the figures in line 7 of Table V nor in line 17 of Table V, nor in line 18 of Table V. Am I correct in that? A. That is right.

Q. And likewise, as I understand it, you do not intend to be responsible for or are you testifying as to the accuracies of the amount shown in line 19 of Table V. Isn't that right? A. That is right.

\* \* \*

[11261] Q. Now, actually of course in line 23 you didn't take the total billing demand of the railroad. You multiplied it by some percentage to arrive at the figure of 28,397. Isn't that right? A. Yes.

Q. What percentage did you use? A. I used the percentage of the total energy supplied to the railroad in Pennsylvania for the month of December, which was 38.9 per cent.

Q. 38.9 per cent of what? A. Of the total energy supplied to the railroad—was supplied for service in Pennsylvania.

Q. Then as I understand it, you are attempting to arrive at the demands of the Pennsylvania Railroad in Pennsylvania by using a ratio based upon energy transmitted and delivered in Pennsylvania to the total energy transmitted to the railroad. Is that right? [11262] A. That is right.

[11267] Q. And the actual losses during the peak hour in December 11, 1944 at 6 p.m. were the result of the transmission and generation during that hour. Isn't that right? A. That is right.

Q. And the transmission and generation during that hour was greatly in excess of what would have been transmitted and generated had there been adverse flow conditions during that hour. Isn't that right?

THE WITNESS: It could have been different. These were the actual for '44.

By Mr. Myse:

Q. It probably would have been less, would it not? A. That would be assumed as a probability.

Q. Well, you as an engineer, wouldn't say, would you, that if you had an amount of energy transmitted and generated less than 300,000 during an hour that the transmission

losses and station uses nevertheless would remain the same [11268] as they were with 300,000, would you?

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[11269] Q. Actually you evaluated the amount of dependable capacity available from those two plants at only 251,500 kw, haven't you? A. That is right.

Q. Now, under conditions of generation of 251,500 kw, or kwh during that hour, there would be less than the actual amount of 23,000 kw in terms of station use and losses. Isn't that right? A. That is probably true.

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[11280] Q. Now, will you look at Table V-A of Exhibit 64, line 1, column 2, and you there show the installed capacity at the Holtwood hydro plant of 104,000 kw, do you not? A. That is right.

Q. Do you know how much of that 104,000 kw is 25-cycle capacity? A. I didn't take that into account in this study.

Q. I haven't asked you that, Mr. Davis. I asked you whether you know how much of it was 25-cycle capacity. A. Something like 80,000, if I recall.

Q. Well, 80,000 checks with my figure. Does that refresh your recollection? A. Yes.

Q. Now, that 80,000 of installed 25-cycle capacity is used principally for Baltimore. There is no question about that, is there? A. That is delivered to the Highlandtown Substation.

Q. And used principally for Baltimore, is it not? A. I would assume that most of the time it is.

Q. What other use there is is the small amount that goes to the Lancaster 25-cycle Area. Isn't that right? A. Well, what might go through the frequency changers in Baltimore and come back up to Safe Harbor over the 220 kv lines.

[11281] Q. In any event, it is delivered to Baltimore before it goes through the frequency changers? A. It is delivered to Baltimore. That is right.

Q. Now, as I understood the figures in column 4 of Table V-A, you arrived at the conclusion that the dependable capacity for the total of the two hydro plants was 67½ per cent of the installed capacity. Isn't that right?

A. Yes, that is right.

Q. And you applied the same 67½ per cent in determining what proportion of the 104,000 at Holtwood hydro was dependable capacity and arrived at 70,221 kw. Is that right? A. Well, the 70,221 is a proportionate division of the total dependable to the hydro plants on the ratio of their installed capacity.

Q. But it is 67½ per cent of the 104,000 kw. Is it not? A. It ought to be. I didn't figure it. It wasn't arrived at in that way.

Q. But the fact is, it is that ratio, isn't it? A. That is what it should be.

Q. So that means that you have assumed that the dependable capacity at Holtwood is 67½ per cent of the installed capacity at Holtwood hydro. Isn't that right? [11282] A. That is right.

Q. Now, if you took 67½ per cent of the 80,000 kw of 25-cycle capacity at Holtwood, how much would you arrive at? My figures show 54,000. Is that right? A. Approximately right. That is, my mental arithmetic hits at approximately that point.

Q. That means, does it not, on your basis there is 54,000 kw of dependable capacity in terms of 25-cycle capacity at Holtwood. Isn't that right? A. That is right.

Q. And most of that is used for Baltimore, isn't it? A. Most of it is delivered to the Baltimore system, that is right. What excess they get on 25-cycle, they get a deficit on 60-cycle.

Q. Now, I think in looking at Exhibit 42, page 20, which is a sheet for December 11, 1944, at 6 p.m., which is the Area 6 system peak, if I recollect the 54,000 kw was the amount actually delivered during the Area 6 system

peak in terms of 25-cycle. Isn't that right? A. It could have been.

Q. Well, let's look at it and check it. A. It says 54,000 delivered to Highlandtown.

Q. According to Mr. Roland, is that right? A. That is right.

Q. And that was 25-cycle capacity, wasn't it? [11283] A. That is 25-cycle. That is right.

Q. Do you have any idea of what the average amount of capacity was during all of the Area 6 system peaks over the life of the contract identified in this record as Item "H" and "I"? A. No, I do not.

Q. That would be from 1931 down to date, would it not? A. That would be. I haven't studied those figures.

Q. Well, I have a figure of 58,000 kw as the average 25-cycle capacity delivered during all of the Area 6 system peaks over the life of this contract I have referred to. I wonder if you could check that figure for me?

TRIAL EXAMINER: You may refresh his recollection.

MR. MYSE: Well, if it does and he agrees with it, that will save him the problem of checking it.

THE WITNESS: I don't think I ever saw that average.

MR. MYSE: Will you check it for me?

MR. GOLDBERG: That sounds like a figure that would be within the ability of the company to check readily enough rather than within the ability of the witness.

MR. MYSE: That is why I gave him the figure.

MR. GOLDBERG: Just giving him the figure doesn't help him. We will have to consider whether we can do it readily. I do know it is a figure they can check.

MR. MYSE: Does that mean you decline to furnish that [11284] figure?

MR. GOLDBERG: That means what I just said.

By Mr. MYSE:

Q. Will you attempt to check it, Mr. Davis, and tell me whether it is correct? A. I will make the attempt.

Q. Now, prior to 1931, 25-cycle capacity was all that Baltimore got from either the Safe Harbor plant which wasn't in existence or the Holtwood plant which was in existence. Isn't that right? A. I have made no study of 1931 conditions.

Q. Well, I haven't asked you for that, but isn't that the fact that prior to 1931 there was no Safe Harbor plant— A. Oh, true.

Q. So that all the energy and capacity that Baltimore did get was in terms of 25-cycle capacity from Holtwood. Isn't that right? A. All except what it might have gotten from the steam plant.

Q. Well, you are not saying that any of the steam plant energy ever got down to Baltimore via Highlandtown, are you? A. Oh, no.

Q. So it must have been 25-cycle capacity. Isn't [11285] that right?

MR. GOLDBERG: I object, Mr. Examiner. The witness has stated he hasn't studied it. All we are getting is a lot of speculation on the record.

TRIAL EXAMINER: The objection is sustained.

By Mr. MYSE:

Q. Of course that 10,820 kw does not represent the amount of energy delivered to Baltimore during any one hour during the year 1944, that is, the maximum amount, does it? A. No, this is based on an estimated dependable capacity. This is not any actual quantity. It has nothing to do with all these actual figures you have been giving here as 1944 actual conditions. If they could depend on 1944 actual conditions all the time, there would be a big increase in the dependable capacity estimate here.

[11334] Q. Now, before we leave Table V-A of Exhibit 64, as I understand that deduction in line 27 of 94,043 kw which you say is Baltimore's two-thirds' share of Safe Harbor, the justification for that deduction is based upon your construction of the contract identified in this record as Items "F" and "G". Isn't that right? A. That is right.

Q. Now, there is one other thing on Table V-A that occurs to me at this moment. Take a look at the firm demand of 51,000 kw shown on lines 16, which you say is the firm demand for P.P. & L. Company. Now, that demand for P.P. & L. Company, was included, plus ten percent reserve, in the figure of 92,400 shown in line 20 which you deducted from a figure of 228,500 kw on line 12, column 5, which you show as the net dependable capacity available for load. Isn't that right? A. Yes.

Q. Now, after making a deduction for the Pennsylvania Railroad Company in Pennsylvania December billing, you arrive at a figure of 104,863 kw in column 5 on line 25 as what you call the balance available for Baltimore [11335] from Holtwood and Safe Harbor. Isn't that right? A. That is right.

Q. And that balance available is supposed to be the dependable capacity available to Baltimore at the time of the most adverse flow of record. Isn't that right? A. At the time of most adverse flow in the month when the system peak occurs, yes.

Q. And that would be the most adverse flow conditions of record for the month of December? A. That is right.

Q. Now, at page 44 of Exhibit 47 you pointed out—and I think we had some testimony with respect to an option on the part of the Generating Companies under Exhibit 76 and 77 to reduce the requirements of P.P. and L. by 20 per cent during peak periods on low flow days. Isn't that right? A. That option is in the contract, yes.

Q. Now, if that option is in effect, it means, does it not, that in addition to the 104,863 kw that you show as the

Balance of dependable capacity for Baltimore from Holtwood and Safe Harbor under adverse flow conditions, there is at least 20 per cent of the 57,200 kw that you show as the firm load for Pennsylvania Power and Light Company under that option. Isn't that right? A. If the option was in effect, you say?

[11336] Q. Yes. A. That is right.

[11347] Q. As I understand your Table V-d of Exhibit 64, Mr. Davis, that table has the purpose of showing, among other things, the ratios of the non-coincident maximum demands of all the customers of Holtwood to the sum or total of all of those non-coincident demands; is not that right? A. That shows that, yes, in column 2.

Q. Now, of course you recognize, do you not, that that 10,820 shown as the annual maximum demand in kw by Baltimore does not represent the maximum load furnished Baltimore during the year 1944 from the Holtwood-Safe Harbor system, is not that right? A. Certainly.

Q. It is something else other than the maximum load furnished, isn't that right? A. That is the amount of dependable capacity that would be left to Baltimore under adverse conditions.

Q. Now, one of the assumptions implicit in the method you pursued in Exhibit 64—that is, the non-coincident method—is that the ratios which you developed in column 2 of Table V-d of that Exhibit, when applied to the joint costs which you show as pool costs will apportion all of those pool costs in proportion to the use that each customer makes of the total capacity available. Isn't that right? A. That is right.

[11348] Q. And that means you must have the annual maximum demands in each case on a comparable basis. Does that not follow? A. Yes.

Q. Now, that demand shown for PP & L, the 66,000 in column 1, line 1 of Table V-d, is a demand shown or reported on an integrated hourly basis, is it not? A. Yes.

Q. And it does include whatever demands there were by the Big and Little Inch pumping stations during the war, which has been changed somewhat? Isn't that right?

A. It includes whatever they were in 1944.

Q. And it also is a demand during wartime? A. It is a demand during 1944, yes.

Q. Now; the demand you show for Philadelphia Electric Company in Column 1, line 2 of Table V-d of Exhibit 64 is not a one-hourly integrated demand, is it? A. I believe that was measured on the 30-minute basis.

Q. And if it had not been measured on a one-hourly basis, it would be somewhat less, would it not? A. It might have been slightly less. In that type of load, there is not a great deal of difference between an hour and a half hour demand.

Q. Did you make any investigation to determine how much less it would have been? [11349] A. Well, in a general way, yes, noting that the hourly demands, one after another, were hardly changed, that is, very slightly changed.

You can justly assume that a half hour demand is not going to be greatly different.

Q. What do you find as the difference between the demand that you used and the one hourly demand which would be comparable to the demand shown in line 1 for PP & L Company? A. I did not find any particular amount. Just observing the very slight change from hour to hour in the Philadelphia Electric demands as they are measured, or from month to month, the maximum demand one month after another showed that the load was very uniform, and that you would not expect any serious difference between the one hour and the 30-minute demand.

Q. But you did not make any investigation to determine actually how much it was, did you? A. I did not have any one-hour measurement, no.

Q. So that in fact, your demand shown for P. E. Company is not comparable to the demand shown for PP & L?

A. There may be a slight difference in the demand shown here and the one-hour demand.

Q. Well, you didn't have the one-hour figures for PP & L Company, either, until you asked for them, did you?

A. No, a lot of this stuff I did not have until I [11350] asked for it.

Q. Didn't you ask the company for the one-hour demand on P-E Company? A. I took the demand that they used in billing. I did not ask them for one-hour demands, no.

[11353] Q. Now, a moment ago you said on a system like Philadelphia Electric Company you believed there was very little difference between the demand determined on a 30-minute basis, and the demand determined on a 1-hour basis, did you not? A. I assumed that there would not be difference enough to make any significant change in the answer in this study.

Q. And is that because it is a relatively small system? A. Well, it was a rather small system.

Q. Well, is that the reason why you came to that conclusion? A. Not especially.

Q. That did not have any bearing on your conclusions, then? A. I don't remember that I thought of that particularly.

Q. Now, with respect to the demand by the Baltimore Company and the Holtwood-Safe Harbor system, there is quite a difference between demands figured on a 30-minute basis and on an hourly basis; is not that right? A. You are talking about actual demands now?

Q. Yes, sir. A. There might be.

Q. There not only might be but there is? [11354] A. There probably is.

Q. And that is due, among other things, to the fact that one of the large steel plants, Bethlehem Steel Company, is connected to the Baltimore system. Isn't that right? A. It might be. I did not investigate that.

Q. Well, don't you know enough about steel company operation to know that that causes considerable swing in the load? A. That is true.

Q. Now, who takes care of those swings in the loads as far as the Baltimore System is concerned.

MR. GOLDBERG: I object to that as repetitious. I think it was taken up both with the witness Roland and with the witness Davis in connection with the cross-examination on the contract aspect of his testimony.

TRIAL EXAMINER: He may answer.

THE WITNESS: With regard to any particular swings at any particular time, I could not tell who takes them up. Of course the swing load coming on to a large system like that will spread itself according to the way governors on generators are set. If all generators are operating on governors the most sensitive governor would take more of the load.

By Mr. Myse:

Q. Well, under most adverse flow conditions of record, which were the conditions which you assumed in arriving at [11355] the conclusions you did in Exhibit 64, at least for purposes of determining demands of Baltimore, all of the steam generating units would be on what is called base load; is not that right? A. That probably would, yes.

Q. And all of the hydro units, particularly the units of Safe Harbor and Holtwood, would be on the peak of the load; isn't that right? A. Those would be used as peaking plants.

Q. So, if there are any swings under those adverse flow conditions caused by the Bethlehem Steel Company plant connected to the Baltimore Company's system, all of those swings would be taken care of by the Holtwood and Safe Harbor hydro units; is not that right? A. That does not absolutely follow.

Q. But the likelihood is that they could; is not that right? A. Well, they might.

Q. And the probabilities are that they would; isn't that right? A. If all steam-generating plants were operating on blocked governors, they would have to take them all. But steam plants take some swings. They cannot help it.

Q. But under those adverse flow conditions, any spinning reserve would be in the hydro plants, would it not? [11356] A. That is probably true.

Q. Well, now, in your view, Mr. Davis, is the carrying of those swings by the hydro plant at Safe Harbor and Holtwood at times of adverse flow a use of the capacity at those plants in excess of the dependable capacity that you determined? A. Well, the dependable capacity, as determined here, is on a one-hour basis.

Q. Well, perhaps you misunderstood my question. I do not think that answers it. A. Dependable capacity is calculated on the basis of the highest one-hour load.

Q. Well, I am talking about the swings within the one-hour under adverse-flow conditions. A. Well, those are averaged out, and the average forms the one-hour.

Q. Well, isn't it a fact that under those conditions, that is, adverse-flow conditions, where there are swings taken care of by the hydro plants at Holtwood and Safe Harbor, that the taking-care of those swings is a use of the capacity at those plants in excess of whatever amount of dependable capacity might be available at those plants? Isn't that right, Mr. Davis? Can you answer that question? A. Those swings could be something in excess of the one-hour integrated load.

[11357] Q. And they might be considerably in excess, isn't that right? A. I do not know how much.

Q. Well, to the extent they are in excess, that is a use of capacity in excess of dependable capacity averaged over the one-hour; isn't it? A. That is right.

Q. Now, if the Holtwood and Safe Harbor hydro plants were not there, Baltimore would have to have additional steam capacity to take care of those swings, would it not? A. I could not answer that. I do not know how much steam capacity would be out of operation at that time, if any, or how much would be used part of the time. There are always high cost steam plants that are not used on base load except in dire emergencies.

Q. Well, whether or not they have to have those high cost steam units, they would have to use them if the hydro plants were not there, would they not? A. That is right.

\* \* \*

[11393] Q. Now, if you refer to Table VI of Exhibit 64, please, in column 7 of that table, line 5, you show a credit to Baltimore of \$501,268. Is that right? A. Yes.

Q. And you figured that credit, at least in your testimony at page 1197, at an energy cost of four mills per kilowatt hour. Isn't that right? A. Yes.

Q. Where did that energy cost figure come from? A. Well, that is a compromise between Baltimore's increment cost of energy and the total average production cost. It is an approximate figure.

Q. Would you say that that is a figure which might be considered the actual cost plus 10 per cent of Baltimore Company? A. No, that probably is a little low for that. I probably should have used a little higher figure.

Q. Well, how much do you think you should have used? A. Well, from information that has been brought out since this exhibit was prepared, I would think it should be 4.6 mills.

Q. You would think that 4.6 mills then represents the cost to Baltimore plus 10 per cent?

MR. GOLDBERG: Cost to Baltimore of what?

[11394] MR. MYSE: The cost of the energy.

THE WITNESS: Well, that is not as much as the overall production cost plus 10 per cent.

By MR. MYSE:

Q. Well, do you think it would represent 10 per cent? Do you think it would represent the costs reported by Baltimore Company on its monthly production statement?

MR. GOLDBERG: Reported as what, increment cost?

MR. MYSE: Whatever costs are reported by Baltimore.

MR. GOLDBERG: What was it?

TRIAL EXAMINER: Do you understand the question, Mr. Witness?

MR. GOLDBERG: I would like to have it read.

THE WITNESS: You mean in the Form 1. report for 1944?

By MR. MYSE:

Q. Well, what I am referring to is Article 6 of Item H which says, "The costs to be used are those reported on Electric's"—that is Baltimore Company's—"monthly production statement covering the month during which steam energy was furnished to Power"—that is Holtwood.

Now, was that four mills or 4.6 mills that you have just made reference to intended to cover the costs so described in Article 6 of Item H? A. No, that was just a general figure of somewhere between Baltimore's over-all average production cost and its [11395] increment costs, trying to assign a reasonable cost to this service regardless of contract prices.

Q. Well, then, as I understand your testimony, your rate of four mills, or the new one that you just mentioned of 4.6 mills, has no relation whatsoever to the costs described in Article 6? A. No, that was not considered.

Q. Just to get my own understanding straight, was that 4.6 mills you just mentioned in your view a cost to Baltimore or a cost to Holtwood? A. No, a cost to Baltimore.

Q. Now, just how do you arrive at the four mills?  
A. I just took a reasonable figure, what I thought was a reasonable figure between what they reported for increment costs, which I thought would be a little too low, and probably average over-all production cost might be a little too high.

Q. What was that incremental cost that they reported?  
A. It was three and a fraction mills, if I recall.

Q. What was the average cost that you considered?  
A. I think the average cost was 4.3, or something like that.

Q. 4.3? A. Yes.

Q. Now, did you examine the cost figures at all that [11396] they reported either as incremental or average to determine what was included in those figures? A. I took the steam production cost.

Q. Well, my question to you is, did you go back of the figures that they reported to determine what made up the incremental cost or the average cost that they reported and which you used? A. I used the figures that were reported on Form 1.

Q. Then I understand that you did not go back of the figures other than to look at Form 1? A. That is all.

Q. Now, you applied the four mills rate in coming to your credit to Baltimore of \$501,268 to the net hourly backfeed received from Baltimore in 1944; isn't that right?  
A. That is right.

Q. And you didn't adjust that net hourly amount to any average water year, did you? A. No.

[11397] Q. Now, if you had adjusted the backfeed to an average water year, you would have gotten somewhat less kwh on a net hourly basis, would you not? A. I don't know what I would have gotten.

Q. Well, you know that the year 1944 was a below-average water year, don't you? A. That is true.

Q. And when you have lower flows, you have more backfeed; isn't that right? A. You usually do.

Q. So that when you have higher flows, you have less backfeed? A. You probably would.

Q. And you would probably have had less backfeed on a net basis in an average year than the 125 million? A. I might have had.

[11398] Q. So, if you want to adjust your figure for a credit to Baltimore on an average-water year basis, you should use if anything, if you are going to use net hourly figures at all, the net hourly figures on an average water-year basis. Isn't that right? A. It might be true.

Q. And if you applied four mills to that, you would come out with less credit; isn't that right? A. If you applied four mills to a smaller number of kilowatt hours, it would be a smaller amount of dollars. The total cost to Baltimore was probably more than the net hourly.

[11399] Q. I don't want to go all over this again, Mr. Davis, but Article 6, Item H is the only contract existing between Baltimore and Holtwood so far as backfeed is concerned; is not that right? A. No.

Q. What other contract is there? A. Items H and I together provide for backfeed.

Q. Now, can you find any other specific article in H and I which says anything about backfeed? A. Well, when it says that the resources will be pooled and there will be coordinated operation to get the greatest effect, that means sometimes there will be backfeed, and it is agreed there will be.

Q. Are you now referring to Item H and Item I and what article? A. I am referring to the article that provides for cooperation, pooling of resources and coordination of [11400] operation.

Q. Are you referring to Article VIII by any chance? A. Yes, that is a description of what I had in mind.

Q. Is that the only article you have in mind? A. I did not have any particular article in mind. I had the pro-

vision for coordination, pooling of resources for the greatest over-all benefit to the system.

Q. Now, if Article 6 of page 9 of Item H is applicable to the purchase of power and steam-generated energy from Baltimore by Holtwood, the rates clearly specified in there are on a daily net amount basis. Is it not? A. I believe that is what it says in—

Q. And if you use—

MR. GOLDBERG: I don't think he finished.

THE WITNESS: That is what it says in that article. That does not say that that is Baltimore's costs, or that that is a cost figure that must be used in allocating costs to the system.

[11407] Q. Now, Mr. Davis, the fact is that none of the revenue from the interchange sales to the Pennsylvania customers is in fact turned over by Baltimore to Holtwood, is it? A. Not in cash, no.

[11415] Q. Now, at Table VI-a, of your Exhibit 64, you add another item to the actual bill rendered by Holtwood to Baltimore, an item in the amount of \$133,750, isn't that correct? A. That is correct.

Q. That means, does it not, that in your revenue shown on line 5, column 9 of Table VI of Exhibit 64 as revenue from Baltimore you have included the amount of \$133,750 as a Conowingo backwater payment, is that right? A. That is right.

Q. Now, actually that payment of \$133,750 was not in fact received by Holtwood Company from Baltimore Company; isn't that right? A. It was received from Conowingo.

Q. And you would not stretch your imagination to say that Conowingo is Baltimore Company, would you? A. Acting for it in this case.

Q. Does that mean that you do say that Conowingo is in fact the Baltimore Company? [11416] A. No.

[11418] Q. In any event, it appears that the Conowingo agreement you had reference to when you included this Conowingo backwater payment in Table VI-a of your Exhibit 64 was made in 1926 or 1927, at least; is not that right? A. I am informed that it was earlier than 1931.

Q. And it was long prior to 1931? A. Yes.

Q. As I understand it, you added that figure of \$133,750 as a revenue of Baltimore on the assumption that Baltimore Company is entitled to something, for which Baltimore Company would otherwise have been obliged to pay. Isn't that right? A. That is right.

Q. Now, are you saying that Baltimore Company was entitled to something that occurred long prior to the 1931 agreement? A. Well, I was looking at it from the point of view of 1944. They got this money from Conowingo by sacrificing something in the value of the plant. If they had not done [11419] that, that value of the plant would have been available to Baltimore, and Baltimore would have paid the extra \$133,000.

Q. Well, what is there in Item H and I which says they are entitled to something which was sacrificed before H and I became effective? A. Nothing. It was the way they were operating in 1944. I just took it on the conditions as they existed at that time.

Q. Well, now, as I understand your testimony, you are saying that if that amount of capacity and energy which was lost by reason of the Conowingo transaction had not been lost, Baltimore would have been entitled to it. Is that right? A. Yes.

Q. And that therefore Baltimore would have been obliged to pay for it? A. Baltimore would under H and I, have paid for it.

Q. Would they have been obliged to pay any more than they are now paying? [11420] A. They would have paid the \$133,000 more.

Q. Well, they would have had more energy and more capacity, too, for that payment? A. Supposedly, yes.

Q. But you have not allocated any of the cost of that lost capacity or energy to Baltimore, have you? A. No, I admit that should be done. That is the thing that is wrong with that. All I can see is that some costs should be allocated along with that service. That might be estimated as the amount of loss that is shown in the contract.

Q. Well, it might be estimated at the same amount as the revenues, \$133,750. Isn't that right? A. No, the amount of loss is more nearly an estimate of the cost of that. The excess amount is only due to the fact that Conowingo could get more value out of that water than Holtwood could, so it enabled them to sell it at a higher price.

Q. Now, actually under the terms of the contract, as you showed in your Exhibit 47, you show that Holtwood's loss of energy output and demand value in not developing its tailrace level to the foot of Cully's Falls was \$72,000 a year, was it not? A. That is right.

Q. And you also show on the next page, page 69, that [11421] \$61,750 annually was agreed upon as the losses by Holtwood Company in addition to the loss of energy cut-put and the demand by reason of not developing the tailrace level at the foot of Cully's Falls; is not that right? A. All the losses I recollect are the \$72,000.

Q. Well, look at page 69, item (d). A. That is Holtwood's participation in Conowingo's gain. They split the gain that Conowingo got in excess of \$72,000 fifty-fifty between the two.

Q. Then you have a different copy than I have. It says, "Holtwood's participation in Conowingo's gain as compensation for other losses by Holtwood," does it not? A. Yes.

Q. And that \$61,750 represents those other losses, does it not? A. That is a general statement of other losses unevaluated. The \$61,750 is a fifty-fifty split of the extra value that Conowingo can get out of that water.

Q. But it is for other losses by Holtwood, is it not? A. That is stated there.

Q. Well, you do not have any doubt of that, do you? A. Well, they could not find what those losses were. It is simply \$61,000 not related to any loss.

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[11426] Q. At some place in your testimony I recollect that you said only a small amount of backfeed transmitted over those lines is used directly for interchange with the Pennsylvania customers. Is that right? A. That is right.

Q. That means that the major portion of the backfeed is used in connection with conversion at Safe Harbor for railroad use or in connection with the firm supply to Pennsylvania customers to the north. Isn't that right? A. That is right.

Q. And it is also true, is it not, that a major portion of whatever interchange is sold to the customers to the north comes from the Penn Water-Safe Harbor generation, [11427] that is, it is actually generated at either Holtwood or Safe Harbor. Isn't that right? A. That is right.

Q. By far the major part of it is generated at Safe Harbor. Is that correct? A. That might be true.

Q. The greatest purchaser of interchange is Pennsylvania Power and Light Company. Is that right? A. Yes.

Q. There is a direct connection from the bus at Safe Harbor with the Harrisburg area where most of that interchange goes. Is that right? A. That is true.

Q. So almost all of the interchange furnished to the P.P. and L. comes from the Safe Harbor bus. Is that right? A. A good portion of it, yes.

Q. By far the largest proportion of it is generated at Safe Harbor? A. That is probably true.

Q. So far as there is interchange with Philadelphia Electric Company over the railroad circuits, that is the Perryville line, that also comes off the Safe Harbor bus. Isn't that right? A. That is true.

Q. And a good share of it is converted at Safe Harbor [11428] and converted from the backfeed which comes up from Baltimore on the 220 lines. Isn't that right? A. A good share of the interchange?

Q. With Philadelphia Electric via the Perryville line? A. Some of that comes up from Baltimore.

Q. You don't know how much it is, then; is that the idea? A. I know how much the total backfeed is.

Q. You don't know the proportion of the backfeed which is actually converted at Safe Harbor, transmitted over the Perryville line, and used for purpose of interchange with Philadelphia Electric. Is that right? A. No.

Q. Since most of this backfeed is generated at either Holtwood or Safe Harbor, or at Safe Harbor—strike that, please.

Since most of the interchange which does go to Pennsylvania customers is generated at either Holtwood or Safe Harbor, does it not follow, that the amount of backfeed which comes up over the 220 lines has no relation to the amount of interchange furnished the Pennsylvania customers? A. Very little.

[11434] CROSS EXAMINATION (continued).

By MR. STURTEVANT:

[11454] Q. Now, Mr. Davis, I should like to ask you some questions regarding the use that is made of the output of the 25-cycle generating units at Holtwood. I do not want to add to the mass of figures which already have been presented, particularly since you have not yet analyzed the

data for 1946. But I do want to enumerate generally some of the ways in which the 25-cycle output is used.

[11455] First, a part of the 25-cycle output is normally transmitted to Lancaster and supplied by Pennsylvania Power and Light Company to its 25-cycle load. Is that correct? A. That is true.

Q. Second, a part of the 25-cycle output is converted to 60-cycles by the frequency changers at Holtwood for supply to the 60-cycle customers of the Holtwood Company. Is that correct? A. Part of it is.

Q. Do you know the capacity of the frequency changers at Holtwood? A. They are rather small, as I remember it. There are two six-thousands or seven-thousands kilowatt—

Q. Two of them together have a capacity of 12 to 14,000 kw? A. That is the way I understand it.

Q. And the amount of the 25-cycle load converted at Holtwood is often limited solely by the capacity of the Holtwood frequency changers. Is that correct? A. That is true.

[11456] Q. Third, some of the 25-cycle output is transmitted to Baltimore, converted there to 60-cycles, and returned to Pennsylvania over the 220 KV lines for supply by the Holtwood Company to the Pennsylvania customers. Is that correct? A. Probably by displacement, that is, more energy is transmitted to Highlandtown, more 25-cycle energy than the load in Baltimore requires, and it is converted to 60-cycle and used for 60-cycle loads in Baltimore which, of course, releases other 60-cycle energy to be delivered up to Safe Harbor over the 220 KV lines.

Q. Some of the output is transmitted to Baltimore and, without the necessity of conversion, is in effect exchanged for 60-cycle steam generated energy which is sent by Baltimore Company to Pennsylvania for supply by Holtwood Company to the Pennsylvania customers. Is that right? A. Surely, that is true.

Q. Fifth, 25 cycle output at Holtwood Company is frequently transmitted to Baltimore in exchange for part of Baltimore Company's two-thirds share of Safe Harbor output, and the latter is sold by Holtwood Company to the Pennsylvania customers, either as firm energy or interchange. Is that right?

THE WITNESS: May I have that again, please?

(Question read).

THE WITNESS: That is true. More than Holtwood's generation and one-third of Safe Harbor that is left after the firm [11457] power customers are supplied is transmitted to Baltimore, that is the amount transmitted is much more than that balance, which is, of course, a portion of Baltimore's share of Safe Harbor power which is going through the Holtwood system and down over their 25-cycle line.

By MR. STURTEVANT:

Q. In these five operations I have mentioned, Mr. Davis, the output of the 25-cycle generators at Holtwood is directly or indirectly used for supplying customers of the Holtwood Company in Pennsylvania. Now, in the sixth place, principally during the higher ranges of flow, 25-cycle energy is transmitted from Holtwood to Baltimore without any substitution or exchange for 60-cycle energy and is supplied by Baltimore Company to its 25-cycle customers. Is that right?

MR. SPARKS: May we have the question, please?

(Question read).

THE WITNESS: That is a little difficult to answer. Of course, at times the 25-cycle energy is all used in Baltimore as such. At other times, much more is delivered to Baltimore over the 25-cycle line than it has 25-cycle load to require it. In that case, either by displacement or by direct

conversion and transmission back to Safe Harbor, it is supplied to Holtwood for use in Pennsylvania.

[11460] Q. Now, Mr. Davis, do not the facts which have been mentioned and also the figures which you have just quoted prove that the 25-cycle generating units of Holtwood are used directly or indirectly for supply to all of the customers of the Pennsylvania Water and Power Company? [11461] A. Well, that is true. By displacement they supply energy into the 60-cycle system which can go any place.

Q. Mr. Davis, is it feasible or proper to assign specific generating units, or costs at the Holtwood plant, to any particular customer? A. I didn't think so, and I didn't do that.

Q. Then your Exhibit No. 64 is correct in assigning all of these costs to what you term the "pool"? A. That was my idea of the best way to allocate all of those production facilities.

Q. Is not the same thing true of the Holtwood substation costs? A. That would be true, also.

[11464] Q. Is it not a fact that large amounts of the Baltimore Company's two-thirds entitlement of the Safe Harbor energy are diverted to Holtwood Company for use by Holtwood in supplying its firm load in Pennsylvania? A. That is true.

Q. Shouldn't this diverted Safe Harbor energy be treated just like backfeed steam energy for purposes of determining the cost of service to the Pennsylvania firm customers? A. So far as Baltimore's two-thirds share of Safe Harbor is concerned, I have left that out of my allocation entirely, both energy and cost of it. So far as Holtwood's one-third share of Safe Harbor energy is concerned, so far as that was used for the Pennsylvania customers I have considered only the net amount sold to those

customers and the net revenue received, and have considered that a sale for the account of Baltimore and credited the revenue accordingly.

[11471]

STANLEY W. ROLAND

## REDIRECT EXAMINATION (Continued)

By MR. GOLDBERG:

[11476] Q. During your cross examination Mr. Myse asked you a number of questions with respect to frequency changers and their operations in an electrical system. (For example, Transcript 9135, etc.) Will you please define "frequency changer" for the record? A. I would define a frequency changer as follows: A frequency changer is a machine which converts the power of an alternating current system from one frequency to another, with or without a change in the number of phases, or in the voltage. This definition appears on page 64 of the American Standard Definitions of Electrical Terms.

Q. In your opinion does a frequency changer and a transformer perform a similar function in a transmission network?

[11477] THE WITNESS: The answer to your question is yes. The function of the transformer is to transfer energy from one circuit to another where the voltages of the circuits are different. The function of the frequency changer is to transfer energy from one circuit to another where the frequency and sometimes the voltage and phase of the two circuits are different.

[11488]

## RE CROSS EXAMINATION

By Mr. MYSE:

Q. You have testified this morning, Mr. Roland, that the function of the transformer is, as I understand your testimony, similar to the function of a frequency changer, is that right? A. In a broad sense that is true, yes.

Q. Well, why do you say in "a broad sense"? Are there some differences? A. Well, certainly there are differences. One is a rotating machine and one is not.

Q. What are the differences in functions, then? A. I stated what the difference in function was.

Q. Well, I don't think I got all that down. A. I said the transformer was to transfer energy from one circuit to another where there was usually a change in voltage and that the frequency changer is to transfer energy from one circuit to another where there is a change in frequency [11489] and sometimes in voltage and in phase.

Q. Now, you say that the transformer is used for the purpose of transferring energy from one circuit to another with a concurrent change in voltage, is that right? A. Yes.

Q. And that transfer from one circuit to another is a transfer of actual energy by the application of Poyntings theorem. Is that right? A. There is such a thing as Poyntings law or Poyntings Theorem, but as far as I am concerned the transfer can take place without regard to Poyntings law.

Q. Well, the fact is in a transformer electrical energy is transmitted right through the transformer using the transformer as the guiding system, as we put it in the Hartford case. Isn't that right?

[11490] THE WITNESS: The energy is transferred from one circuit to the other. Now, as to what process is involved, I could not explain that.

By Mr. Myse:

Q. You mean to say there is no electrical energy transmitted through a transformer, Mr. Roland? A. Of course there is.

Q. But there is no electrical energy transmitted by a frequency changer, is there? A. In the same broad sense, there is yes.

Q. There is no electrical circuit between one end of the frequency changer and the other? A. No, there is a mechanical link there, but viewing the thing broadly from a functional standpoint they both do the same thing. Both the transformer and the frequency changer do the same thing.

[11491] Q. You are not saying, are you, Mr. Roland, that the shaft which connects up the two ends of the frequency changer actually transmits electrical energy, are you?

A. No, that is mechanical energy.

Q. So there is that difference between a frequency changer and a transformer? A. There is a difference in the type of equipment used but broadly the function is the same. They transfer energy from one circuit to another.

Q. Well, now, in that same broad sense, a turbine will transfer energy from the steam pipelines to the electrical circuit, is not that right? A. Well, there is a distinction. The transformer and the frequency changer are parts of the transmission network, and in that network they do perform that function of linking together various parts of the network.

Now, when you get back into the turbine you are out of the network.

Q. You don't consider, then, that the steam turbine end of the generator is part of the electrical system, is that right? A. Not a part of the electrical system, no, not the turbine.

Q. Is it not part of the generating system, then? A. Oh, yes, it is part of the mechanical end of the [11492] system, the generating system, yes.

Q. Well, what about the shaft which connects up the steam turbine and the generator, is that part of the electrical system or not? A. Well, I suppose any differentiation would be somewhat arbitrary there. I don't know just where you would draw the line on that.

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[11574]

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SAMUEL JOSEPH

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## CROSS EXAMINATION (Continued)

By MR. SPARKS:

[11584] A. I have this in mind, Mr. Sparks: Utilities that have reasonable capitalizations would obtain substantially the same fair rate of return, other things being equal. For example, the capitalization for a utility may be entirely reasonable if it is 50 per cent bonds and 50 per cent stock, or if it is 40 per cent bonds, 20 per cent preferred and 40 per cent common stock. The utilities which fall within the range of reasonable capitalization therefore fall in the same range with respect to the fair rate of return. They create no special problems, though the precise nature of their outstanding securities may be different.

Q. Are you saying, Mr. Joseph, that those utilities having reasonable capitalizations would have the same rate of return? A. Would command approximately the same fair rate of return, yes, sir.

Q. When you use the word "command" there, do you mean that they should be allowed the same fair rate of [11585] return? A. Yes, sir.

Q. What are the data in Exhibit 46 which may be considered in determining or estimating the cost of equity capital to Penn Water as a component of the fair rate of return? A. The cost of equity capital to Penn Water is not shown in Exhibit 46.

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Q. I don't think that answers my question, Mr. Joseph. It was, what are the data which may be considered in a determination or the estimating of the cost of equity capital to Penn Water as a component of the fair rate of return.

A. The cost of equity capital to Penn Water is unnecessary in a determination of the fair rate of return for Penn Water. Furthermore, I am not at all sure that it can be obtained.

Q. Is it true, then, in view of your last answer, Mr. Joseph, that the cost of debt capital to Penn Water is not to be considered in arriving at a fair rate of return?

[11586] A. No, that is a somewhat different problem. If the cost of debt capital to Penn Water appears to be reasonable, then in my opinion it may be accepted as one of the elements for the establishment of a fair rate of return.

Q. What are the other elements? A. Bear in mind that you are talking about different things when you are talking about the cost of equity capital and the cost of funded debt capital. Cost of funded debt capital is rather easily determined, its reasonableness quite easily determined, but the cost of equity capital is a far different thing and can not in most cases be readily determined.

[11592] Q. So that it is correct to say that the measures of the credit of an enterprise are the yield rates at which creditors buy bonds as well as the earnings-price ratios, if those earnings-price ratios express the prospective return basis upon which the stock is sold in the market?

A. I think that is a fair statement, yes, sir.

[11597] Q. Should the rate of return be fixed at a lower level than otherwise merely because of an absence of the prospect of need for new capital? A. The tendency would probably be that way, I believe.

Q. Are you saying, Mr. Joseph, that the rate of [11598] return should be fixed at a lower level than otherwise merely because of an absence of the prospective need for new capital? A. My answer is based on the fact that I

believe that if there were a need for substantial new capital, the rate of return might have to be slightly higher than otherwise.

Q. In the absence of the need, then, I take it from your answer you would say the rate of return should be lower. Is that correct? A. It would tend to be lower.

Q. Well, should it be? A. Well, it should imply a fairness in the situation that I am trying to eliminate, Mr. Sparks. It would be lower because when you raise new capital you tend to pay a little more than is fair on existing capital.

[11621] Q. Mr. Joseph, at page 10354 you said that the basis of selection of the ten common stocks included in the averages shown on page 38-A was in part the "Representativeness of the Utility itself;" what did you mean by that term "representativeness of the utility itself"?

[11622] Q. Well, is the utility generally of a class that may be used in representing the electric industry?

Q. And that is what you meant when you used the term, "representativeness of the utility itself," on page 10354? A. Yes, sir.

Q. Do you mean, Mr. Joseph, that any electric operating utility would be within that class? A. Unless there were some circumstance that made it a special situation, that would be true.

[11638] Q. Now, then, I have referred to your answer beginning at line 8 and ending at line 20 on page 10072 and I ask you whether you meant by that answer that it is not necessary for the Federal Power Commission to have your testimony and Exhibit 46 in order to determine a fair rate of return for Penn Water? A. I think a fair rate of return could be determined without it.

Q. Then your answer to my question is yes, is that correct? A. Yes.